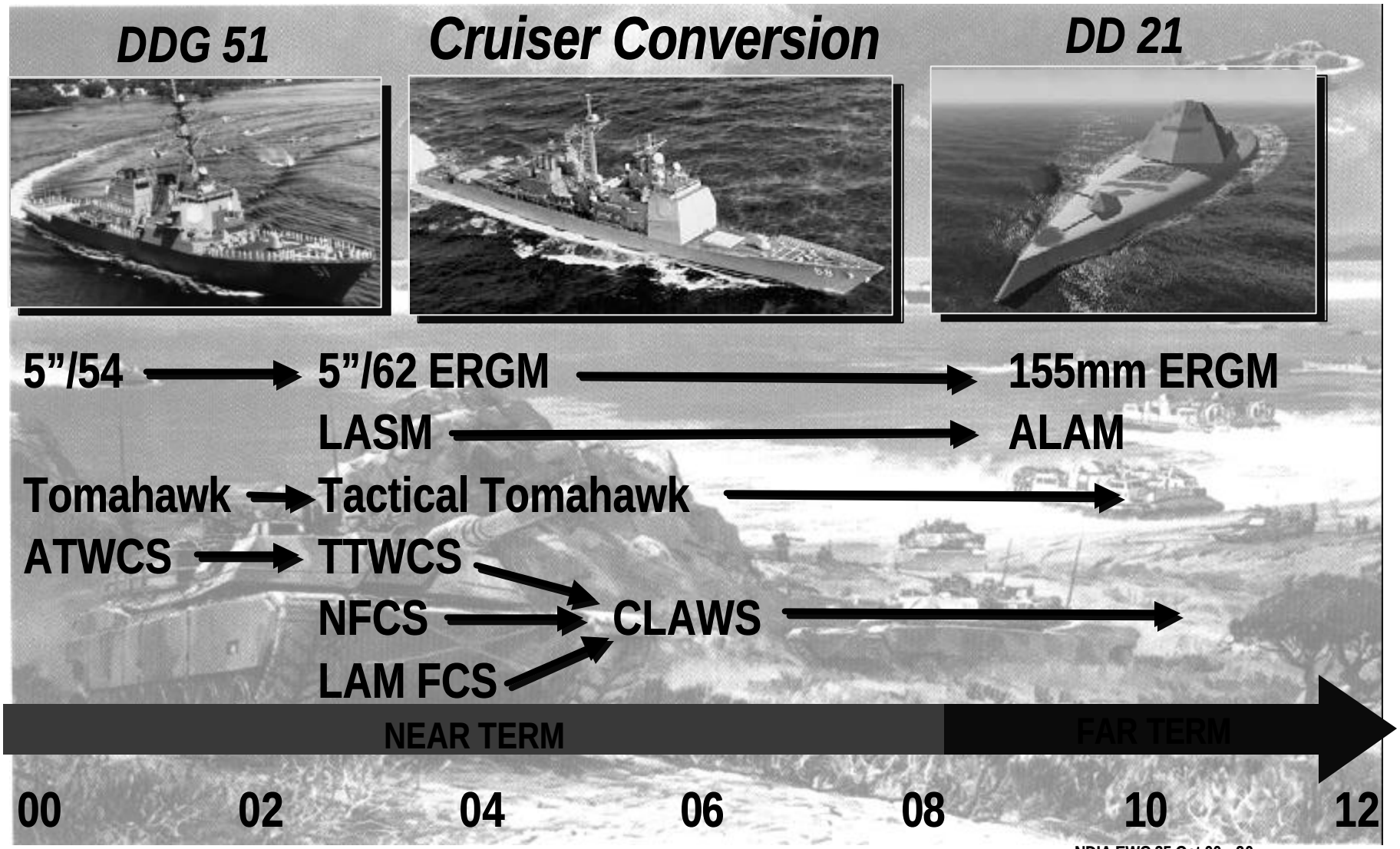
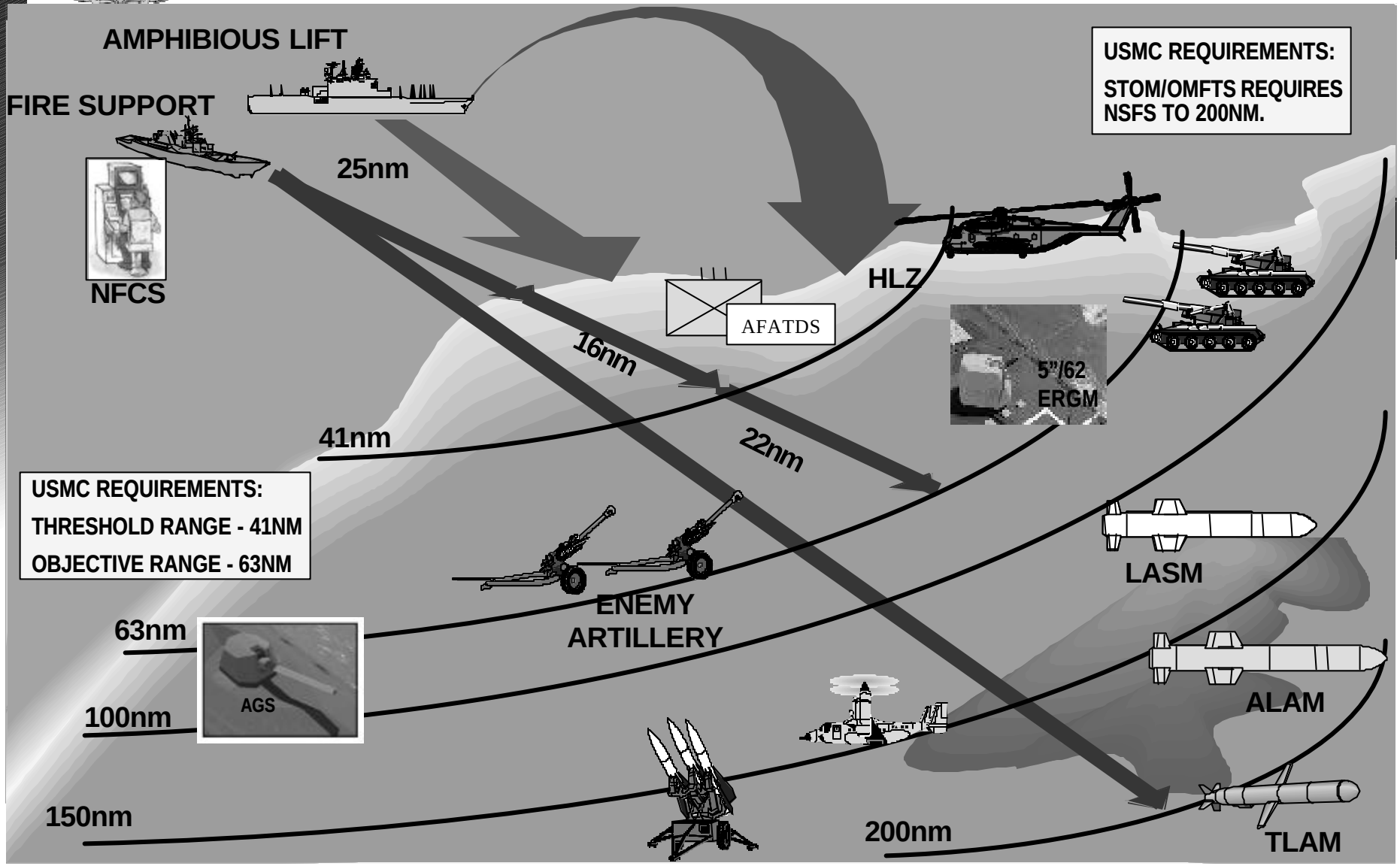
Meeting The Requirements

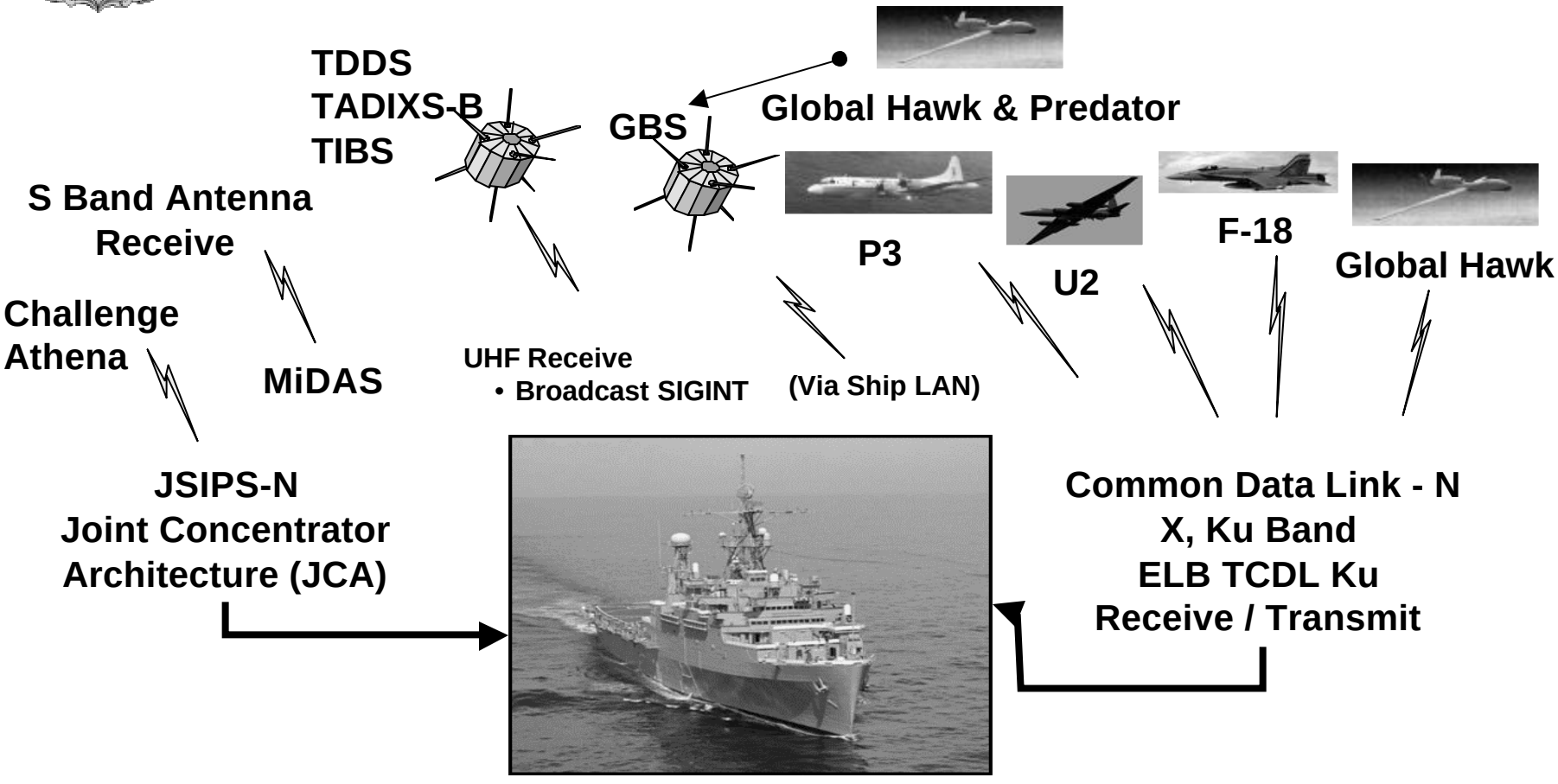


NSFS Requirements

Plus: Responsiveness, Accuracy, and Volume



Naval Fires Network (NFN)



Sensor to Shooter: Necessary for Time Critical Targeting

Naval Fires Control System
Focusing Surface Warfare's Capability

Is Interoperable with USMC and US Army AFATDS Units and other joint systems

Provides Digital connectivity

Develops Naval Fire Mission Plans that respond to the Land Warrior's requirements

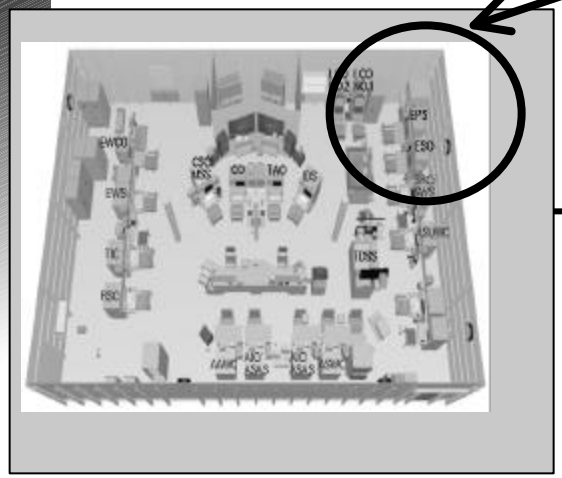
Supports ERGM, Land Attack Standard Missile, and Tactical Tomahawk Engagements

Surface Combatant - Common Land Attack Warfare System (SC CLAWS) [TLN]

A vision for the future...

Command and Decision	*Control System*	*Weapon*

Land Attack Warfare Coordinator



TTWCS NFCS

SC-CLAWS

LAM Fire Control

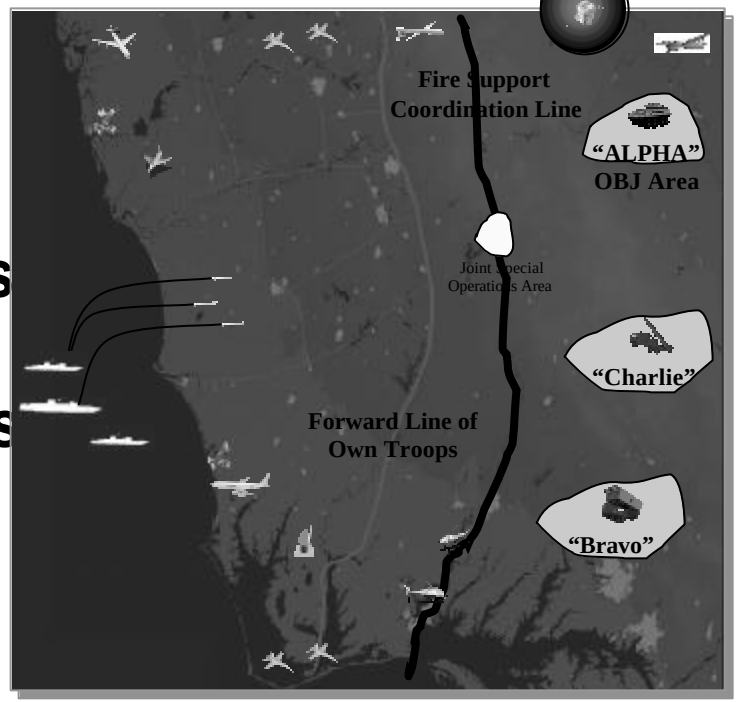
- Command and Control

- Land Tactical Display
- Strategic and Tactical Fires Planning
- Engagement Control

- Tomahawk Blk2/3
- Tactical Tomahawk
- MK 34 Gun Weapon System
- ERGM
- LASM
- ALAM

Joint Targeting Attack and Assessment Capability

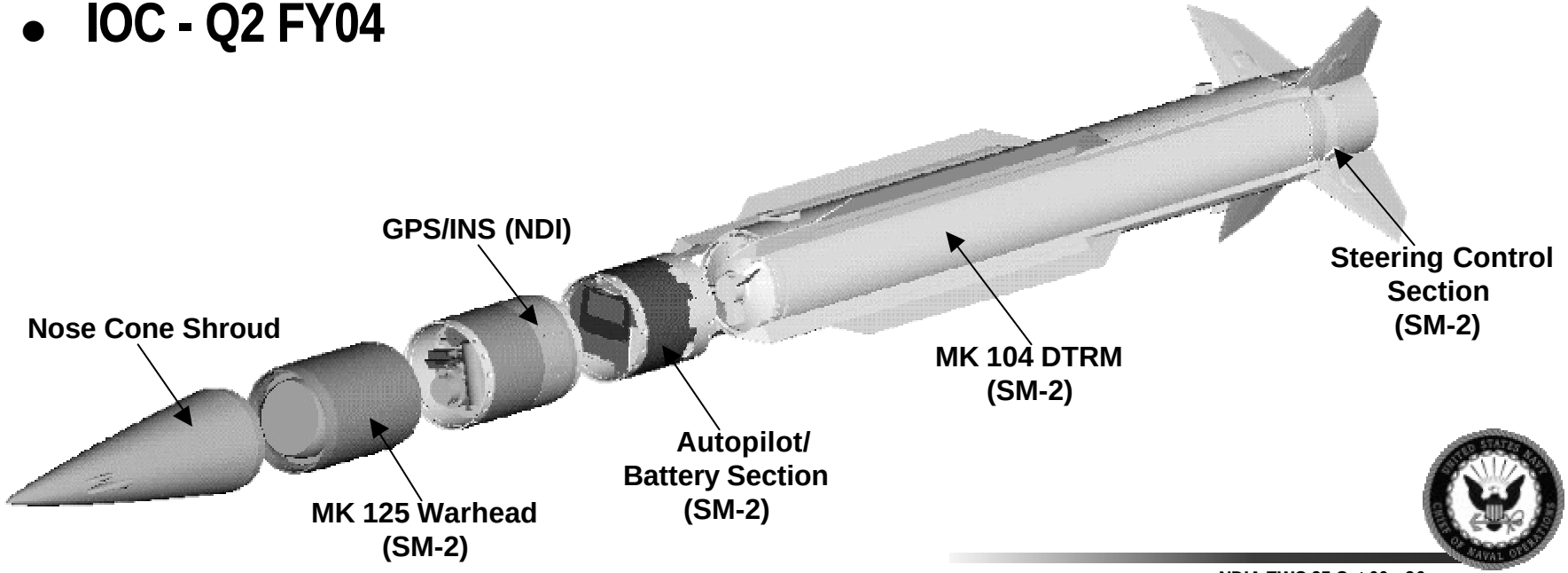
- Prototype Capability to Solve TST Problem
- Builds on AADC Experiences
- Develops/Displays Surveillance COA's
  - ⇨ Integrates sensor/environmental/terrain
- Develops/Displays Engagement COA's
  - ⇨ Considers weapons performance/fly-out/collateral damage
- Enable Execution or Monitoring of Attacks on TST's
  - ⇨ Full 3-D battlespace visualization
  - ⇨ Means for airspace deconfliction
- Develops BDA COA's
  - ⇨ Integrates sensors to provide fastest means to assess damage / determine re-attack requirements



Solving the Time Sensitive Target Problem

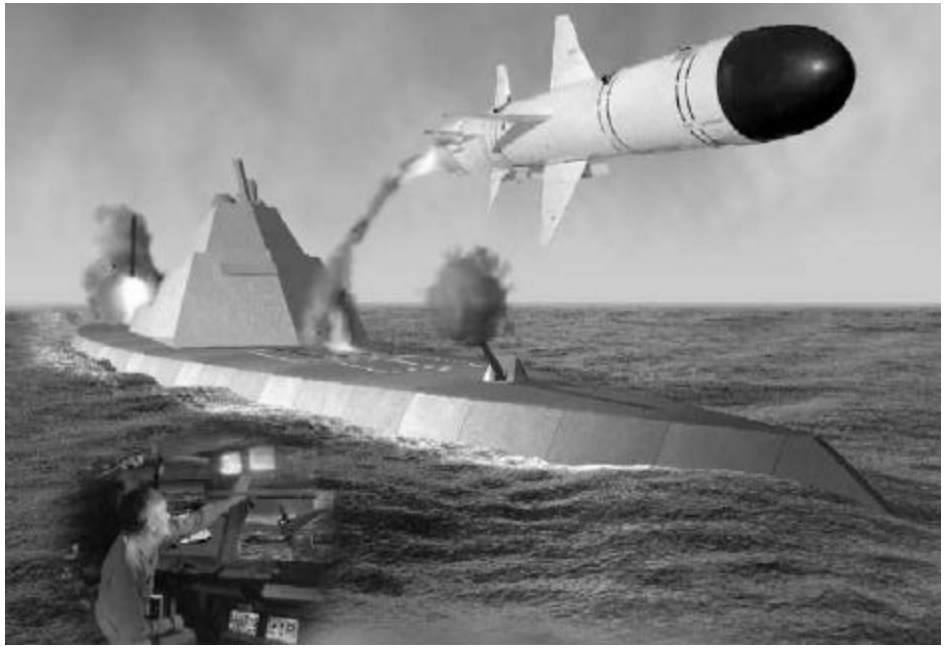
Land Attack Standard Missile (LASM)

- **OSD issues resolved with respect to LASM - May 99**
- **Program Definition and Risk Reduction (PDRR) initiated - July 99**
- **Land Attack Missile ORD approved - August 99**
- **EMD contract awarded with Raytheon - signed July 00**
- **First EMD test launch - Summer 01**
- **LAM Fire Control System - aligned to support missile**
- **IOC - Q2 FY04**



Advanced Land Attack Missile (ALAM)

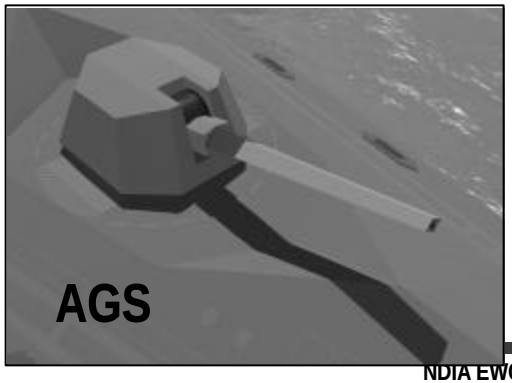
- Requirement
  - Increased Range (Beyond AGS) To Support Extended Operating Forces
  - Improved Lethality
  - Expanded Target Set
- Solution
  - Advanced Land Attack Missile
- Complementary Program
  - Leverages Emerging Technologies
  - Potential Payloads
    - Anti-Armor
    - Advanced Submuntion
    - Complex Unitary Warhead
- Status
  - Funded in PR01
  - Begin AoA in FY99
  - IOC Coincidental w/DD 21
  - ALAM ESC Met JUL 00



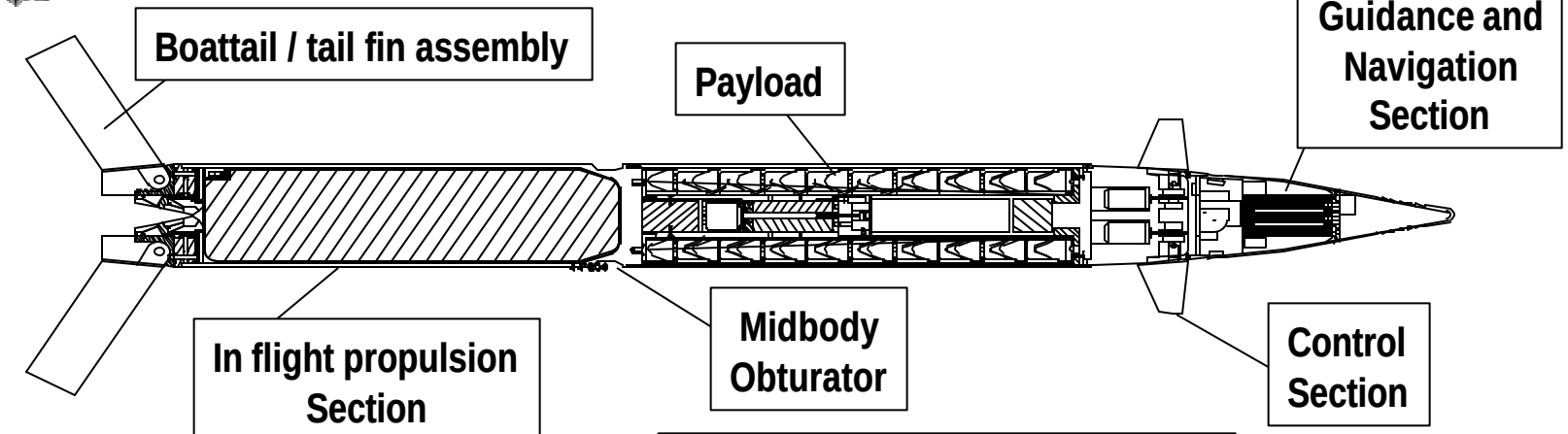
- ALAM Characteristics:
  - 300nm Objective / 200nm Threshold
  - DD 21 Target Set
  - ALAM AoA Will Validate Performance Requirements

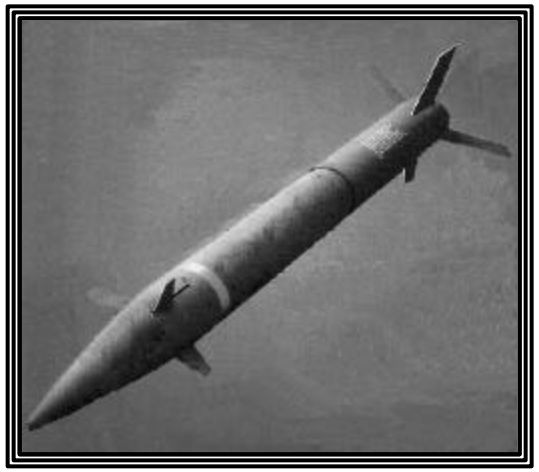
Land Attack Guns
155mm & 5”/62 ERGM

- **5”/62 Prototype Gun delivered ahead of schedule to NSWC DD**
  - Shore based Operational Analysis (OA) testing complete
  - Gun LRIP approved 12 April 99
  - Fires ERGM and conventional ammo
  - First install in USS WINSTON CHURCHILL (DDG81) completed November 99
- **5”/62 ERGM Prototype fired April 97**
  - Acquired GPS signal; developed navigation solution
  - Overcoming technical challenges
- **AGS**
  - A ZUMWALT Class program
  - Fully automated ammunition magazine
  - Variety of payloads (DPICM, SADARM, Unitary)
  - IOC coincidental with DD21



Extended Range Guided Munition (ERGM)





ERGM Characteristics

- Range: 63NM
- GPS/INS Coupled Guidance and Navigation
- Rocket Assisted Projectile
- 72 M-80 DPICM Submunitions
- 10m - 20m CEP
- Time-of-Flight ~7 Minutes at 63nm

First Guided Flight of ERGM Scheduled for September 2001 at White Sands Missile Range

Advanced Gun System (AGS)

Need

- Volume of fires & sustainability
- Improved lethality
- Increased range

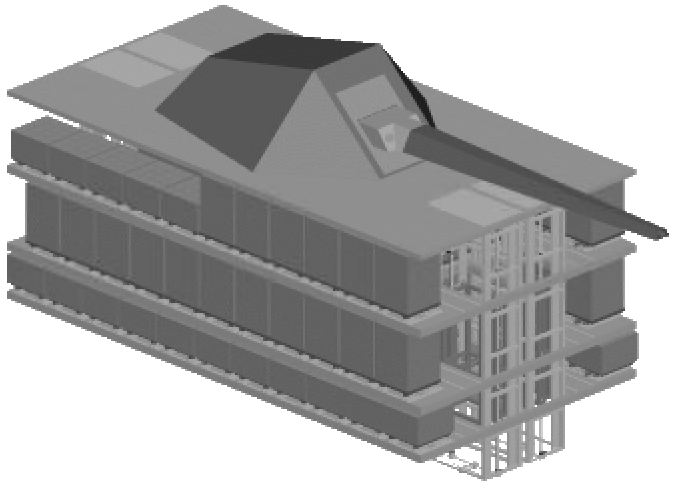
Solution

- Expand on USA / USMC 155mm
- Advanced gun system

Complementary program

- Leverages existing ordnance technologies
  - 5” ERGM
  - Army XM982 155mm projectile
  - SADARM / unitary warheads
  - Army Crusader program

Trainable / Elevatable Concept



- DD 21 ORD requirements:
  - 2 X 155mm Artillery Battery equivalency
  - 750 rounds / barrel
  - 100nm range
  - Reduced signature
  - Advanced Handling System
  - Reduced maintenance

} Reduced Manning

DD 21 will have at least 2 Battery Equivalencies (BE) for throw weight missions, and up to 6 BE for Stationary Targets/Destruction missions

Battery Equivalencies

AUG 99 NSWC DD STUDY

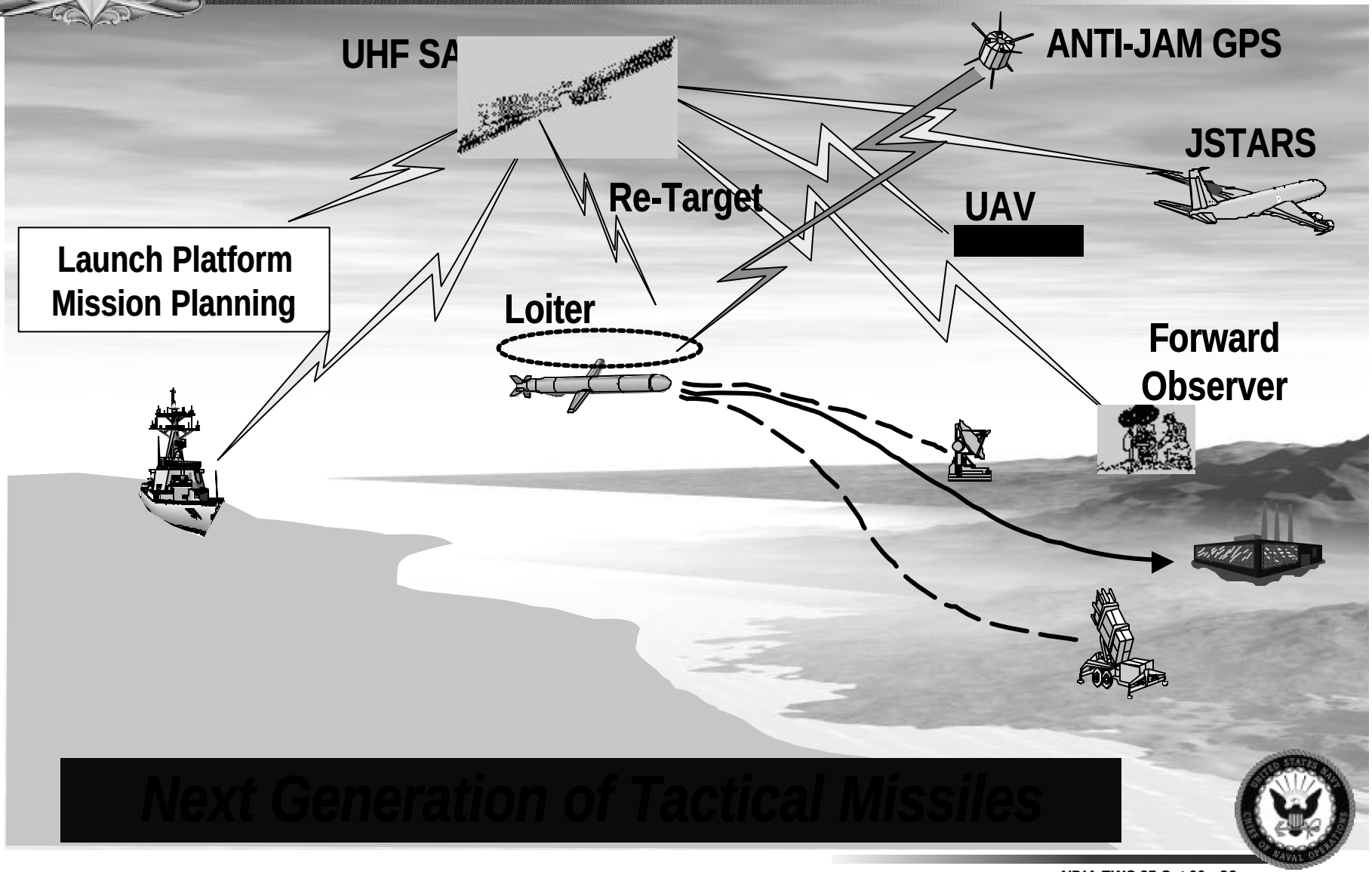
- Against Stationary Targets, Precision Guided Weapons provide 3:1 advantage over unguided projectiles
- AGS firing rate of 12 rounds/minute per gun will equal the throw weight of a 6 gun 155MM artillery battery, which has a firing rate of 2 rounds/minute per gun
- ZUMWALT Class will have at least 2 Battery Equivalencies (BE) for throw weight missions, and up to 6 BE for Stationary Targets/Destruction missions

Tomahawk Employment

- Fully Operational and an Allied weapon
- Integrated with strike warfare
- Employed as a tactical weapon during “Allied Force”
  - Tactical usage increases flexibility
- Effective against Fixed and Relocatable targets in “Allied Force”
  - 17% of all targets struck in Allied Force
- Primary choice for time sensitive targets
- Tomahawks led the attack
  - All weather
  - Day / Night
  - Little concern for IADS
- Rapid mission planning
- Minimal collateral damage

No Visa Required

Tactical Tomahawk
. . . Changing The Landscape



Surface Warfare
Land Attack Capabilities

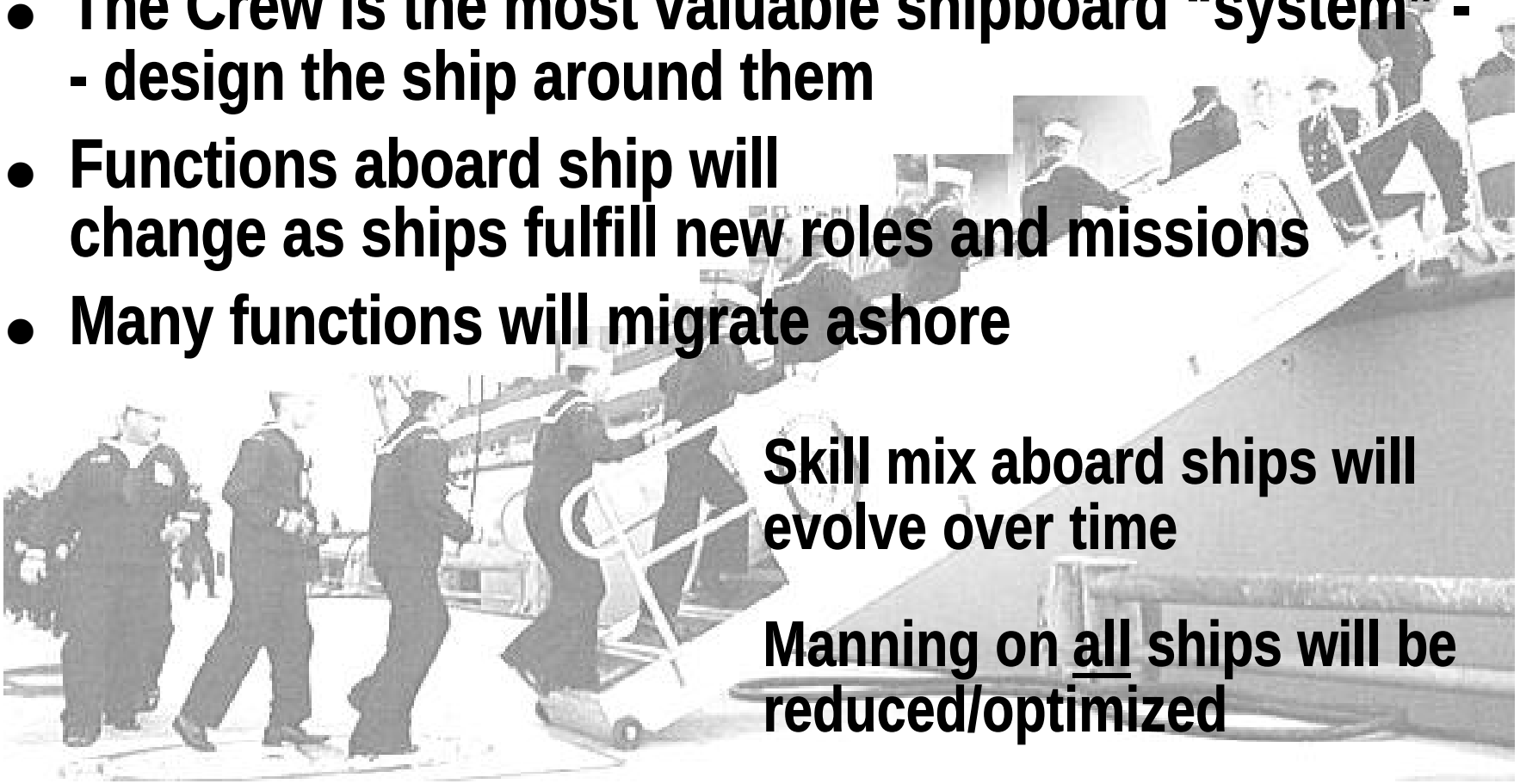
✓ Partially Meets Requirements

✓ Fully Meets Requirements

USMC Requirement	5" ERGM	155 ERGM	TLAM	TACTOM	LASM	ALAM
Range 41/63nm (Guns)	✓	✓ (100nm)				
Range 200/222nm (Missiles)			✓ (900nm)	✓ (1,600nm)	✓ (150nm)	✓ (300nm)
Accuracy 20/50m	✓	✓	✓	✓	✓	✓
Responsiveness	✓	✓		✓ (Loiter)	✓ Super-sonic)	✓ (Hyper/ Super-sonic)
Lethality	✓ (Concerns)	✓ (Family of munitions)	✓ (Subs, Unitary)	✓ (Subs, Unitary, Penetrator, anti-armor)	✓ (Unitary)	✓ (Family of munitions)
Volume of Fire	✓ (Massed Fires)	✓ (Two guns, Big magazine)				

21st Century Concept -- Sailors

- **The Crew is the most valuable shipboard "system" -- design the ship around them**
- **Functions aboard ship will change as ships fulfill new roles and missions**
- **Many functions will migrate ashore**



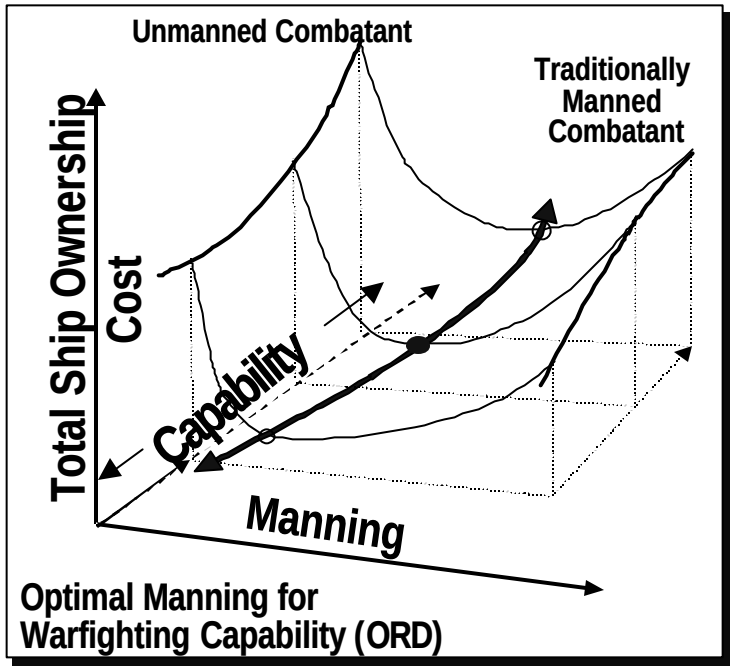
Skill mix aboard ships will evolve over time

Manning on all ships will be reduced/optimized

We must recruit and retain the "right" mix of sailors

What is Optimal Manning?

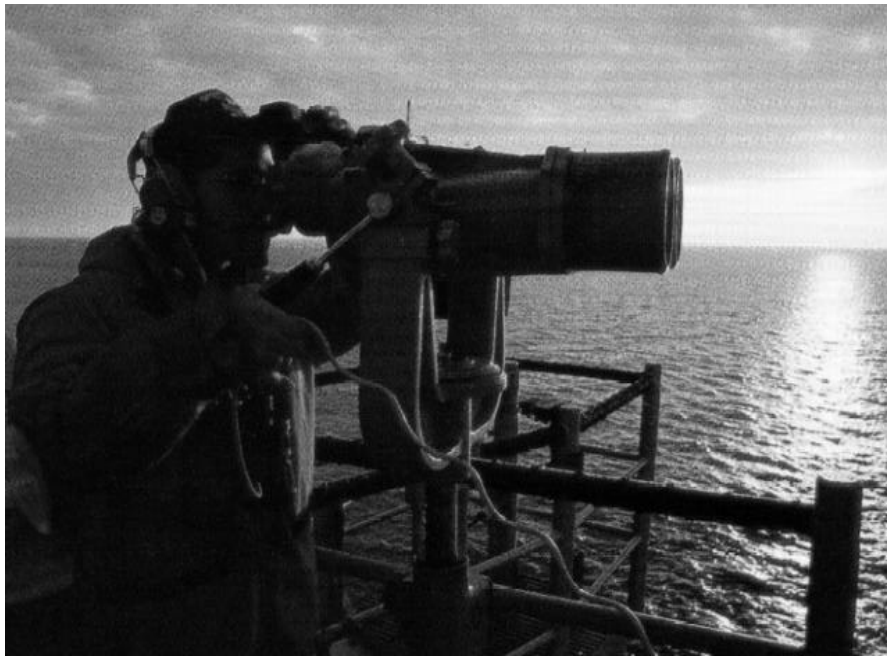
- Optimal manning is NOT minimal manning
- Optimal manning is achieved by a top down analysis of mission functions.
- Functions are further analyzed to determine the appropriate approach:
  - ⇨ Technology
    - – Software
    - – Hardware
  - ⇨ Sailors
- Cost / benefit tradeoffs are made



- The result is an Optimally manned ship; just the right number of crew, no more and no less!

Our Vision of the Future

- **New ships and systems that are supportable, interoperable, and compatible with the old**
- **Shore infrastructure that efficiently supports both new and legacy ships**
- **A Surface Navy that meets evolving warfighting demands with valued crews trained and ready**




Any Questions